

Article 34 Amendment (2/2): marked

DESCRIPTION

TELEPHONE DISPLAYING LOCAL TIME AT OTHER END OF CONNECTION,
AND RELATED METHODS AND COMPUTER PROGRAMS

TECHNICAL FIELD

The present invention relates to telephones, and particularly to technology for displaying the local time at the other end of the connection.

BACKGROUND ART

These days, international telephone rates are becoming cheaper, providing most people with the opportunity to freely make international calls.

While telephone manners dictate that it is preferable to avoid making non-urgent calls late at night or during mealtimes, this requires a caller placing an international call to an area in a different time zone to make a judgment based on the local time at the other end of the connection.

There exist conventional telephones designed to facilitate this process that use the country code included in the telephone number, or a combination of the country code and the area code which follows the country code, to deduce the local time at the other end of the connection prior to making the call, and furnish the caller with the deduced time (e.g. see Japanese Published Patent Application No. 2002-171334).

However, a problem with these conventional telephones is that they are unable to properly display the local time at the other end if the telephone being called is a mobile telephone equipped with an international roaming function, for example.

Mobile telephones equipped with an international roaming function can be called using the same telephone number as that used domestically, merely by being connected to a local communication system in the area to which the user moves. For this reason, there is no way of working out from the telephone number where the mobile telephone (i.e. the local time) is currently being used.

DISCLOSURE OF THE INVENTION

In view of the above problem, the present invention aims to provide a telephone capable of properly providing a caller with the local time at the other end of the connection, when the callee's telephone does not give any clues for deducing the local time from the telephone number, as is the case with mobile telephones equipped with an international roaming function, for example, and to provide related methods.

To resolve the above problem, a telephone ~~eff~~pertaining to the present invention is for displaying a local time of a locality of a callee, and includes an acquiring unit operable to acquire a telephone number of a callee and region information relating to thea locality of the callee, a judging unit operable to judge whether the telephone number is a telephone number satisfying a predetermined condition

that enables international roaming in a telephone network of a region in a different time zone, a storage unit operable to store the telephone number, identification information identifying the callee of the telephone number, and the region information in association with the callee each other, based on a user operation, if judged in the affirmative, a calculating unit operable to calculate the local time of the locality using shown by the stored region information, with reference to the storage unit, if a user operation selecting one of the telephone number and the identification information is performed, and a display unit operable to display the local time.

According to this structure, it is possible, by acquiring region information, to find out the callee's locality even if the telephone number of the callee's telephone does not include information relating to the locality, and thus to correctly calculate and display the local time.

Since the region information according to this structure does not need to be inputted every time the local time is displayed, the time and effort required by the user can be greatly reduced in the case of the user inputting the region information manually, for example. By updating the region information only when the callee shifts time zones, the user is always able to obtain the correct local time of the callee.

Also, the region information may be transmitted from a telephone of the callee represented by a modulation signal

in an audible frequency band, and the acquiring unit may receive the modulation signal and acquire the region information by decoding the received modulation signal.

Alternatively, the region information may be transmitted from a telephone of the callee represented by an electronic mail, and the acquiring unit may acquire the region information by receiving the email.

Since the region information according to these structures is acquired from the callee's telephone, the user is not required to input the region information manually. Since region information represented by a modulation signal can be acquired through an audio line, it is possible to acquire region information even from mobile telephones in regions where a data line cannot be used. Furthermore, region information represented by an email is ideal when the region information is acquired from a mobile telephone in a different time zone.

Also, the region information may be recorded in a location register that manages a locality of the telephone of the callee in a telephone network, and the acquiring unit may acquire the region information from the location register via the telephone network.

Also, the acquiring unit may acquire the region information as a reply to a callout to the telephone of the callee, and the telephone may further include a reception unit operable to receive a user operation after the display of the local time, the operation being one of approving and canceling a call, and an instructing unit operable to

instruct the telephone network to one of approve and cancel the call, upon receipt of the user operation.

Since the region information according to these structures is acquired from a location register, the user is not required to input the region information manually. Since region information expressing the latest locality of the callee is managed in the location register in connection with the location registration of the mobile telephone, the correct local time is always displayed by using the region information.

In particular, if the telephone network is configured to notify the region information to the telephone in response to a callout to the callee and to place a call to the callee's telephone after receiving an instruction approving the call, the user can determine whether or not to make the call based on the latest local time displayed after dialing.

~~— A telephone of the present invention is for use in a plurality of time zones, and includes an acquiring unit operable to acquire region information relating to a locality of the telephone, and a notifying unit operable to notify the acquired region information to another telephone.~~

~~— Also, the notifying unit may perform the notification by transmitting the region information to the other telephone represented by a modulation signal in an audible frequency band.~~

~~— Alternatively, the notifying unit may perform the notification by transmitting the region information to the other telephone represented by an email.~~

~~By notifying its locality to the other telephone, the telephone is, according to these structures, able to have the other telephone correctly display the local time at the locality of the telephone. Also, the above-mentioned effects are obtained as a result of transmitting the region information represented by a modulation signal or an email.~~

~~A telephone network of the present invention that includes a first telephone for use in a first country and usable in a second country through international roaming, a second telephone for use in the first country, a first base station installed in the first country, a first exchange center installed in the first country, a home location register installed in the first country, a second base station installed in the second country, and a second exchange center installed in the second country. The first exchange center includes a location registration unit operable to receive via the second base station and the second exchange center a request for location registration from the first telephone being used in the second country through international roaming, and to record region information relating to a locality of the first telephone in the home location register, a reception unit operable to receive from the second telephone via the first base station, specification information specifying the first telephone, and a notifying unit operable to notify the region information relating to the locality of the first telephone recorded in the home location register to the second telephone, based on the received specification information.~~

~~Also, the reception unit may receive the specification information from the second telephone as a callout request to the first telephone, and the first exchange center may further include a call unit operable to call the first telephone via the second exchange center and the second base station if a predetermined time period elapses without receiving an instruction from the second telephone after notifying the region information to the second telephone.~~

~~According to these structures, the local time at the locality of the telephone can be correctly displayed on another telephone as a result of the telephone network notifying the locality to the other telephone. Since the telephone network is able to provide the latest region information obtained as a result of the location registration, the other telephone is always able to display the correct local time based on the region information. Also, the effects described above are obtained by placing a call to the callee after receiving approval from the other telephone.~~

~~A telephone system of the present invention includes a first telephone for use in a plurality of time zones, and a second telephone for displaying a local time of a locality of the first telephone. The first telephone includes a first acquiring unit operable to acquire region information relating to a locality of the first telephone, and a notifying unit operable to notify the region information to the second telephone. The second telephone includes a second acquiring unit operable to acquire the region information from the first telephone, a calculating unit operable to calculate~~

~~the local time using the region information, and a display unit operable to display the local time.~~

A telephone system ~~of~~pertaining to the present invention includes a telephone network for managing a movement of a first telephone, and a second telephone for displaying a local time of a locality of the first telephone. The telephone network includes a location registration unit operable to record region information relating to the locality of the first telephone, a reception unit operable to receive from the second telephone, specification information specifying the first telephone, and a notifying unit operable to notify the region information to the second telephone, upon receipt of the specification information. The second telephone includes an acquiring unit operable to acquire ~~the region information from the telephone network~~a telephone number of the first telephone, a judging unit operable to judge whether the telephone number is a telephone number satisfying a predetermined condition that enables international roaming in a telephone network of a region in a different time zone, a storage unit operable to store the telephone number, identification information identifying a callee of the telephone number, and the region information notified from the telephone network in association with a caller each other, based on a user operation, if judged in the affirmative, a calculating unit operable to calculate the local time of the locality using shown by the stored region information, with reference to the storage unit, if a user operation selecting one of the telephone number and the

identification information is performed, and a display unit operable to display the local time.

Also, the reception unit may receive the specification information from the second telephone as a callout request to the first telephone, and the telephone network may further include a call unit operable to call the first telephone if a predetermined time period elapses without receiving an instruction from the second telephone after notifying the region information to the second telephone.

According to these structures, the effects described above are obtained in the telephone system.

A method ~~of~~pertaining to the present invention is a display method for having a telephone provided with a storage unit displaying a local time of a locality of a callee performed in a telephone, and includes the steps of acquiring a telephone number of the callee and region information relating to a the locality of the callee, judging whether the telephone number is a telephone number satisfying a predetermined condition that enables international roaming in a telephone network of a region in a different time zone, storing the telephone number, identification information identifying the callee of the telephone number, and the region information in association with the callee each other in the storage unit, based on a user operation, if judged in the affirmative, calculating the local time of the locality using shown by the stored region information, with reference to the storage unit, if a user operation selecting one the telephone number and the identification information

is performed, and displaying the local time.

~~— A method of the present invention is a notification method for notifying a locality performed in a telephone for use in a plurality of time zones, and includes the steps of acquiring region information relating to a locality of the telephone, and notifying the region information to another telephone.~~

~~— A method of the present invention is a notification method for notifying a locality of a first telephone to a second telephone performed in a telephone network that includes the first telephone, which is for use in a first country and is usable in a second country through international roaming, the second telephone, which is for use in the first country, a first base station installed in the first country, a first exchange center installed in the first country, a home location register installed in the first country, a second base station installed in the second country, and a second exchange center installed in the second country. The method includes the steps of receiving via the second base station and the second exchange center a request for location registration from the first telephone being used in the second country through international roaming, and recording region information relating to the locality of the first telephone in the home location register, receiving from the second telephone via the first base station, specification information specifying the first telephone, and notifying the region information relating to the locality of the first telephone recorded in the home location register~~

~~to the second telephone, based on the received specification information.~~

~~Also, the specification information may be received from the second telephone as a callout request to the first telephone, and the method may include the further step of calling the first telephone if a predetermined time period elapses without receiving an instruction from the second telephone after notifying the region information to the second telephone.~~

~~A method of the present invention is a display method for having a second telephone display a local time of a locality of a first telephone performed in a telephone system that includes the first telephone, which is for use in a plurality of time zones, and the second telephone. The method includes the steps of acquiring, in the first telephone, region information relating to the locality of the first telephone; notifying the region information from the first telephone to the second telephone; acquiring, in the second telephone, the region information from the first telephone; calculating, in the second telephone, the local time using the region information; and displaying, in the second telephone, the local time.~~

Also, Aa method of pertaining to the present invention is a display method for displaying a local time of a locality of a first telephone performed in a telephone system that includes a second telephone provided with a storage unit and a telephone network for managing a movement of the first telephone. The method includes the steps of recording, in

the telephone network, region information relating to the locality of the first telephone; receiving, in the telephone network, specification information specifying the first telephone from the second telephone; notifying, in the telephone network, the region information to the second telephone, upon receipt of the specification information; acquiring, in the second telephone, ~~the region information from the telephone network~~ a telephone number of the first telephone; judging whether the telephone number is a telephone number satisfying a predetermined condition that enables international roaming in a telephone network of a region in a different time zone; storing, in the second telephone, the telephone number, identification information identifying a callee of the telephone number, and the region information notified from the telephone network in association with a callee each other in the storage unit, based on a user operation, if judged in the affirmative; calculating, in the second telephone, the local time of the locality ~~using~~ shown by the stored region information, with reference to the storage unit, if a user operation selecting one of the telephone number and the identification information is performed; and displaying, in the second telephone, the local time.

Also, the specification information may be received from the second telephone as a callout request to the first telephone, and the method may include the further step of calling, in the telephone network, the first telephone if a predetermined time period elapses without receiving an

instruction from the second telephone after notifying the region information to the second telephone.

A computer program epertaining to the present invention may be a machine-readable program for causing a computer to execute the steps included in any of the above methods.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1 is a functional block diagram showing the overall structure of a telephone of embodiment 1;

CLAIMS

1. (Currently Amended) A telephone ~~for displaying a local time of a locality of a callee,~~ comprising:

an acquiring unit operable to acquire a telephone number of a callee and region information relating to thea locality of the callee;

a judging unit operable to judge whether the telephone number is a telephone number satisfying a predetermined condition that enables international roaming in a telephone network of a region in a different time zone;

a storage unit operable to store the telephone number, identification information identifying the callee of the telephone number, and the region information in association with the calleeeach other, based on a user operation, if judged in the affirmative;

a calculating unit operable to calculate ~~thea~~ local time of the locality using ~~shown by~~ the stored region information, with reference to the storage unit, if a user operation selecting one of the telephone number and the identification information is performed; and

a display unit operable to display the local time.

2. (Previously Cancelled)

3. The telephone of claim 1, wherein

the acquiring unit receives in an audible frequency band from a telephone of the callee a modulation signal representing the region information, and acquires the region

information by decoding the received modulation signal.

4. The telephone of claim 1, wherein

the region information is transmitted from a telephone of the callee represented by an electronic mail, and

the acquiring unit acquires the region information by receiving from a telephone of the callee an electronic mail in which the region information is described.

5. (Currently Amended) The telephone of claim 1, wherein

the region information is recorded in a location register that manages a ~~locality~~movement of the telephone of the callee in a telephone network, and

the acquiring unit acquires the region information by receiving the region information transmitted from the location register via the telephone network.

6. The telephone of claim 5, wherein

the acquiring unit acquires the region information as a reply to a callout to the telephone of the callee, and

the telephone further comprises:

a reception unit operable to receive a user operation after the display of the local time, the operation being one of approving and canceling a call; and

an instructing unit operable to instruct the telephone network to one of approve and cancel the call, upon receipt of the user operation.

7. (Cancelled) ~~A telephone for use in a plurality of time zones, comprising:~~

~~—— an acquiring unit operable to acquire region information relating to a locality of the telephone; and~~

~~—— a notifying unit operable to notify the acquired region information to another telephone.~~

8. (Cancelled) ~~The telephone of claim 7, wherein the notifying unit performs the notification by transmitting the region information to the other telephone represented by a modulation signal in an audible frequency band.~~

9. (Cancelled) ~~The telephone of claim 7, wherein the notifying unit performs the notification by transmitting the region information to the other telephone represented by an electronic mail.~~

10. (Cancelled) ~~A telephone network that includes a first telephone for use in a first country and usable in a second country through international roaming, a second telephone for use in the first country, a first base station installed in the first country, a first exchange center installed in the first country, a home location register installed in the first country, a second base station installed in the second country, and a second exchange center installed in the second country, the first exchange center comprising:~~

~~—— a location registration unit operable to receive via the second base station and the second exchange center a~~

~~request for location registration from the first telephone being used in the second country through international roaming, and to record region information relating to a locality of the first telephone in the home location register;~~

~~— a reception unit operable to receive from the second telephone via the first base station, specification information specifying the first telephone; and~~

~~— a notifying unit operable to notify the region information relating to the locality of the first telephone recorded in the home location register to the second telephone, based on the received specification information.~~

11. (Cancelled) ~~The telephone network of claim 10, wherein~~
~~— the reception unit receives the specification information from the second telephone as a callout request to the first telephone; and~~

~~— the first exchange center further comprises:~~

~~— a call unit operable to call the first telephone via the second exchange center and the second base station if a predetermined time period elapses without receiving an instruction from the second telephone after notifying the region information to the second telephone.~~

12. (Cancelled) ~~A telephone system comprising a first telephone for use in a plurality of time zones, and a second telephone for displaying a local time of a locality of the first telephone,~~

~~the first telephone including:~~
~~a first acquiring unit operable to acquire region~~
~~information relating to a locality of the first telephone,~~
~~and~~
~~a notifying unit operable to notify the region~~
~~information to the second telephone, and~~
~~the second telephone including:~~
~~a second acquiring unit operable to acquire the region~~
~~information from the first telephone,~~
~~a calculating unit operable to calculate the local time~~
~~using the region information; and~~
~~a display unit operable to display the local time.~~

13. (Currently Amended) A telephone system comprising a telephone network for managing a movement of a first telephone, and a second telephone for displaying a local time of a locality of the first telephone,

the telephone network including:

a location registration unit operable to record region information relating to the locality of the first telephone;

a reception unit operable to receive from the second telephone, specification information specifying the first telephone; and

a notifying unit operable to notify the region information to the second telephone, upon receipt of the specification information, and

the second telephone including:

an acquiring unit operable to acquire the region

information from the telephone network a telephone number of the first telephone;

a judging unit operable to judge whether the telephone number is a telephone number satisfying a predetermined condition that enables international roaming in a telephone network of a region in a different time zone;

a storage unit operable to store the telephone number, identification information identifying a callee of the telephone number, and the region information notified from the telephone network in association with a callee each other, based on a user operation, if judged in the affirmative;

a calculating unit operable to calculate the local time of the locality ~~using~~ shown by the stored region information, with reference to the storage unit, if a user operation selecting one of the telephone number and the identification information is performed; and

a display unit operable to display the local time.

14. The telephone system of claim 13, wherein

the reception unit receives the specification information from the second telephone as a callout request to the first telephone, and the telephone network further comprises:

a call unit operable to call the first telephone if a predetermined time period elapses without receiving an instruction from the second telephone after notifying the region information to the second telephone.

15. (Currently Amended) A method for having a telephone provided with a storage unit displaying a local time of a locality of a callee ~~performed in a telephone~~, comprising the steps of:

acquiring a telephone number of the callee and region information relating to a ~~the~~ locality of the callee;

judging whether the telephone number is a telephone number satisfying a predetermined condition that enables international roaming in a telephone network of a region in a different time zone;

storing the telephone number, identification information identifying the callee of the telephone number, and the region information in association with the callee ~~each~~ other in the storage unit, based on a user operation, if judged in the affirmative;

calculating the local time of the locality ~~using~~ shown by the stored region information, with reference to the storage unit, if a user operation selecting one the telephone number and the identification information is performed; and

displaying the local time.

16. (Previously Cancelled)

17. (Cancelled) ~~A method for notifying a locality performed in a telephone for use in a plurality of time zones, comprising the steps of:~~

~~acquiring region information relating to a locality of the telephone; and~~

~~— notifying the region information to another telephone.~~

18. (Cancelled) ~~A method for notifying a locality of a first telephone to a second telephone performed in a telephone network that includes the first telephone, which is for use in a first country and is usable in a second country through international roaming, the second telephone, which is for use in the first country, a first base station installed in the first country, a first exchange center installed in the first country, a home location register installed in the first country, a second base station installed in the second country, and a second exchange center installed in the second country, comprising the steps of:~~

~~— receiving via the second base station and the second exchange center a request for location registration from the first telephone being used in the second country through international roaming, and recording region information relating to the locality of the first telephone in the home location register;~~

~~— receiving from the second telephone via the first base station, specification information specifying the first telephone; and~~

~~— notifying the region information relating to the locality of the first telephone recorded in the home location register to the second telephone, based on the received specification information.~~

19. (Cancelled) ~~The method of claim 18, wherein~~

~~the specification information is received from the second telephone as a callout request to the first telephone, and~~

~~the method comprises the further step of:~~

~~calling the first telephone if a predetermined time period elapses without receiving an instruction from the second telephone after notifying the region information to the second telephone.~~

20. (Cancelled) A method for having a second telephone display a local time of a locality of a first telephone performed in a telephone system that includes the first telephone, which is for use in a plurality of time zones, and the second telephone, comprising the steps of:

~~acquiring, in the first telephone, region information relating to the locality of the first telephone,~~

~~notifying the region information from the first telephone to the second telephone,~~

~~acquiring, in the second telephone, the region information from the first telephone,~~

~~calculating, in the second telephone, the local time using the region information, and~~

~~displaying, in the second telephone, the local time.~~

21. (Currently Amended) A method for displaying a local time of a locality of a first telephone performed in a telephone system that includes a second telephone provided with a storage unit and a telephone network for managing a movement

of the first telephone, comprising the steps of:

recording, in the telephone network, region information relating to the locality of the first telephone;

receiving, in the telephone network, specification information specifying the first telephone from the second telephone;

notifying, in the telephone network, the region information to the second telephone, upon receipt of the specification information;

acquiring, in the second telephone, ~~the region information from the telephone network~~ a telephone number of the first telephone;

judging whether the telephone number is a telephone number satisfying a predetermined condition that enables international roaming in a telephone network of a region in a different time zone;

storing, in the second telephone, the telephone number, identification information identifying a callee of the telephone number, and the region information notified from the telephone network in association with ~~a callee~~ each other in the storage unit, based on a user operation, if judged in the affirmative;

calculating, in the second telephone, the local time of the locality ~~using~~ shown by the stored region information, with reference to the storage unit, if a user operation selecting one of the telephone number and the identification information is performed; and

displaying, in the second telephone, the local time.

22. The method of claim 21, wherein

the specification information is received from the second telephone as a callout request to the first telephone, and

the method comprises the further step of:

calling, in the telephone network, the first telephone if a predetermined time period elapses without receiving an instruction from the second telephone after notifying the region information to the second telephone.

23. (Currently Amended) A computer program ~~that causes for~~ having a telephone provided with a storage unit to execute display processing for displaying a local time of a callee, ~~the display processing comprising~~ the steps of:

acquiring a telephone number of the callee and region information relating to a locality of the callee;

judging whether the telephone number is a telephone number satisfying a predetermined condition that enables international roaming in a telephone network of a region in a different time zone;

storing the telephone number, identification information identifying the callee of the telephone number, and the region information relating to the locality of the callee in association with the callee each other in the storage unit, based on a user operation, if judged in the affirmative;

calculating the local time of the locality using shown

by the stored region information, with reference to the storage unit, if a user operation selecting one of the telephone number and the identification information is performed; and

displaying the local time.

24. (Previously Cancelled)

25. (Cancelled) ~~A computer program that causes a telephone for use in a plurality of time zones to execute notification processing for notifying a locality to another telephone, the notification processing comprising the steps of:~~

~~—acquiring region information relating to a locality of telephone; and~~

~~—notifying the region information to the other telephone.~~

26. (Cancelled) ~~A computer program that causes a first exchange center to execute notification processing for notifying a locality of a first telephone to a second telephone performed in a telephone network that includes the first telephone, which is for use in a first country and is usable in a second country through international roaming, the second telephone, which is for use in the first country, a first base station installed in the first country, a first exchange center installed in the first country, a home location register installed in the first country, a second base station installed in the second country, and a second~~

~~exchange center installed in the second country, the notification processing comprising the steps of:~~

~~—— receiving via the second base station and the second exchange center a request for location registration from the first telephone being used in the second country through international roaming, and recording region information relating to the locality of the first telephone in the home location register;~~

~~—— receiving from the second telephone via the first base station, specification information specifying the first telephone; and~~

~~—— notifying the region information relating to the locality of the first telephone recorded in the home location register to the second telephone, based on the received specification information.~~

27. (Cancelled) ~~The computer program of claim 26, wherein~~
~~—— the specification information is received from the second telephone as a callout request to the telephone, and~~
~~—— the notification processing comprises the further step of:~~

~~—— calling the first telephone if a predetermined time period elapses without receiving an instruction from the second telephone after notifying the region information to the second telephone.~~

28. (Cancelled) ~~A computer program that causes a telephone system to execute display processing for having a second~~

~~telephone display a local time of a locality of a first telephone performed in the telephone system that includes the first telephone, which is for use in a plurality of time zones, and the second telephone, the display processing comprising the steps of:~~

~~—— acquiring, in the first telephone, region information relating to the locality of the first telephone;~~

~~—— notifying the region information from the first telephone to the second telephone;~~

~~—— acquiring, in the second telephone, the region information from the first telephone;~~

~~—— calculating, in the second telephone, the local time using the region information; and~~

~~—— displaying, in the second telephone, the local time.~~

29. (Currently Amended) A computer program that causes a telephone system to execute display processing for displaying a local time of a locality of a first telephone, the telephone system including a second telephone provided with a storage unit and a telephone network for managing a movement of the first telephone, the display processing comprising the steps of:

recording, in the telephone network, region information relating to the locality of the first telephone;

receiving, in the telephone network, specification information specifying the first telephone from the second telephone;

notifying, in the telephone network, the region

information to the second telephone, upon receipt of the specification information;

acquiring, in the second telephone, ~~the region information from the telephone network~~ a telephone number of the first telephone;

judging whether the telephone number is a telephone number satisfying a predetermined condition that enables international roaming in a telephone network of a region in a different time zone;

storing, in the second telephone, the telephone number, identification information identifying a callee of the telephone number, and the region information notified from the telephone network in association with ~~a callee~~ each other in the storage unit, based on a user operation, if judged in the affirmative;

calculating, in the second telephone, the local time of the locality ~~using~~ shown by the stored region information, with reference to the storage unit, if a user operation selecting one of the telephone number and the identification information is performed; and

displaying, in the second telephone, the local time.

30. The computer program of claim 29, wherein

the specification information is received from the second telephone as a callout request to the first telephone, and

the display processing comprises the further step of:
calling, in the telephone network, the first telephone

if a predetermined time period elapses without receiving an instruction from the second telephone after notifying the region information to the second telephone.

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